

## Programme & The Book of Abstracts

*Seventeenth Annual Conference*

# YUCOMAT 2015

Herceg Novi, Montenegro, August 31 – September 4, 2015

*organised by*

**MATERIALS RESEARCH SOCIETY OF SERBIA**

*endorsed by*



*20<sup>th</sup> Anniversary YUCOMAT Conference*

**SEVENTEENTH ANNUAL CONFERENCE**

# **YUCOMAT 2015**

Hunguest Hotel Sun Resort Herceg Novi, Montenegro,  
August 31-September 4, 2015  
<http://www.mrs-serbia.org.rs>

## **Programme and The Book of Abstracts**

Organised by:  
**Materials Research Society of Serbia**

Endorsed by:  
**Materials Research Society,  
European Materials Research Society  
and  
Federation of European Material Societies**

**Title:** THE SEVENTEENTH ANNUAL CONFERENCE  
**YUCOMAT 2015**  
Programme and The Book of Abstracts

**Publisher:** Materials Research Society of Serbia  
Knez Mihailova 35/IV, P.O.Box 433, 11000 Belgrade, Serbia  
Phone: +381 11 2185-437; Fax: + 381 11 2185-263  
<http://www.mrs-serbia.org.rs>

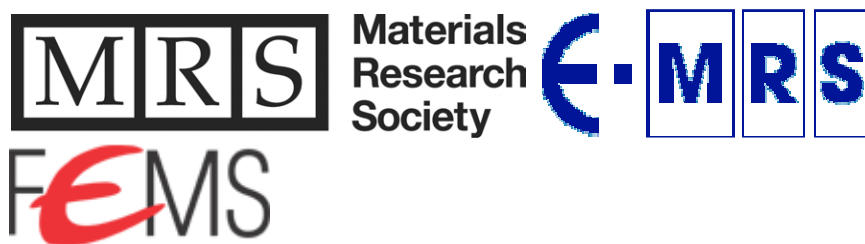
**Editors:** Prof. Dr. Dragan P. Uskoković and Prof. Dr. Velimir Radmilović

**Technical editor:** Aleksandra Stojičić

**Cover page:** Aleksandra Stojičić and Milica Ševkušić  
Front cover: modified photo by BélaBéla; Wikimedia  
([http://commons.wikimedia.org/wiki/File:Herceg\\_Novi.JPG](http://commons.wikimedia.org/wiki/File:Herceg_Novi.JPG)); CC-BY-SA 3.0 Unported  
Back cover: modified photo *Belgrade bridges* by mcveja; Flickr  
(<https://www.flickr.com/photos/mcveja/2428406067/>); CC-BY 2.0 Generic

**Copyright** © 2015 Materials Research Society of Serbia

**Acknowledgments:** This conference is 20<sup>th</sup> Anniversary of the First YUCOMAT Conference.



**Printed in:** Biro Konto  
Sutorina bb, Igalo – Herceg Novi, Montenegro  
Phones: +382-31-670123, 670025, E-mail: [bkonto@t-com.me](mailto:bkonto@t-com.me)  
Circulation: 220 copies. The end of printing: August 2015

O.S.A.8.

### Fluorine Doping of Layered $\text{Na}_x\text{CoO}_2$ Structure

Dragana Jugović, Miloš Milović, Miodrag Mitrić, Nikola Cvjetičanin,

Max Avdeev, Bojan Jokić, Dragan Uskoković

<sup>1</sup>*Institute of Technical Sciences of SASA, Belgrade, Serbia*, <sup>2</sup>*Vinča Institute of Nuclear Sciences, University of Belgrade, Belgrade, Serbia*, <sup>3</sup>*Faculty of Physical Chemistry, University of Belgrade, Belgrade, Serbia*, <sup>4</sup>*Bragg Institute, Australian Nuclear Science and Technology Organisation, Locked Bag 2001, Kirrawee DC, NSW 2232, Australia*, <sup>5</sup>*Faculty of Technology and Metallurgy, University of Belgrade, Belgrade, Serbia*

The room temperature Na-ion secondary battery has been under focus lately due to its feasibility to compete against the already well-established Li-ion secondary battery. Transition metal oxides of general formula  $\text{Na}_x\text{MO}_2$  have been investigated as potential cathode materials for sodium batteries. Layered  $\text{Na}_x\text{CoO}_2$  is synthesized via solid-state method at 900 °C in air atmosphere. Fluorine doping of the as-prepared powder is established by the use of ammonium hydrogen difluoride ( $\text{NH}_4\text{HF}_2$ ) as a fluorinating agent. The fluorination takes place only at low temperature (200 °C), while the treatment at higher temperatures ( $\geq 400$  °C) facilitates the formation of NaF. It is shown that various and controllable amounts of fluorine can be successfully incorporated into the structure. Finally, the effects of fluorine doping on both structural and electrochemical properties are examined.

O.S.A.9.

### Advances in Improvement of Pb-Based Thin Layers Deposited on Nb Substrate

Anna Kosinska<sup>1</sup>, Marek Barlak<sup>1</sup>, Jerzy Lorkiewicz<sup>1</sup>, Jacek Sekutowicz<sup>2</sup>,  
Robert Nietubyć<sup>1</sup>, Lukasz Kurpaska<sup>1</sup>, Katarzyna Nowakowska – Langier<sup>1</sup>

<sup>1</sup>*National Center for Nuclear Research, st. A. Soltana 7, 05-400 Swierk, Poland*,

<sup>2</sup>*Deutsches Elektronen Synchrotron (DESY), 85 Notkestrasse, D-22-607 Hamburg, Germany*

Improvement of adhesion between deposited lead thin layer on niobium substrate is a challenging task due to their highly different physical and chemical characteristics. The fundamental problem is that niobium and lead tend to oxidize which cause poor deposition of the applied layers. In this study we use the Rod Plasma Injector (RPI) technique (operating in PID and DPE regimes) to solve the problem of insufficient adhesion between Pb layer deposited on Nb substrate with or without additional Ti or Sn layers. In order to assess thickness of thin layer we use Calotester device and SEM/EDX techniques. Finally, nanoindentation technique was implemented to evaluate mechanical properties of studied system. Reported results revealed that melting of the substrate occurs above certain energy threshold. Moreover, the Ti layer unlike the Pb layer is continuous, smooth and homogeneous. The goal of this study is to improve adhesion of deposited Pb thin layer.